

# PATENT SPECIFICATION

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## (54) ATTACHMENT OF WINDSCREEN WIPER BLADES TO WIPER ARMS

(71) We, TRICO—FOLBERTH LIMITED, a British Company, of Great West Road, Brentford, Middlesex, TW8 9HP, do hereby declare the invention, for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is concerned with the attachment of windscreen wiper blades to wiper arms, in particular with the use of adaptors to allow side-mounting blades to be used with types of wiper arm not expressly intended to carry them.

A known type of side-mounting wiper blade includes a circumferentially grooved mounting pin, extending from a side of the blade, and lying in use approximately parallel to the windscreen being wiped. One example of such a wiper blade is shown in British Patent No. 1,254,109.

The invention concerns adaptors to attach side mounting wiper blades of the type described above to wiper arms of the hook kind. One example of such an arm is shown in British Patent No. 726,275. Such an arm has an outer portion of rectangular section and comprises, in succession, a straight main part, a part curved into semi-circular shape, and a short straight terminal part, parallel to and spaced from a lower face of the main part. Such arms are widely in use on existing cars, in conjunction with wiper blades which are not of the side-mounting kind.

It can be advantageous to a user of such a car to be able to replace an existing wiper blade by a side-mounting blade. If retail outlets can reduce the number of different wiper blades to be held in stock as spares, the likelihood is reduced of a customer finding that the blade he needs is out-of-stock. Furthermore, a side-mounting blade may have a lower profile than the blade supplied with the car as original equipment. The consequences may include better appearance, less

obstruction of driver's vision, and less exposure to lifting by air flow when the car is travelling at high speed.

The present invention can be broadly defined in terms of a set of parts, that is to say a set of parts according to the present invention comprises a wiper blade, a wiper arm, and an adaptor; the wiper blade including a circumferentially grooved mounting pin, extending from a side of the blade; characterised in that the wiper arm is of a kind, known per se, having an outer portion of rectangular section and comprising, in succession, a straight main part, a part curved into semi-circular shape, and a short straight terminal part, parallel to and spaced from a lower face of the main part; and in that the adaptor comprises two components which can be assembled to meet substantially in a plane containing the axis of the pin and so constitute a body having an external shape which fits into the U-shaped space defined by the parts of the arm, each component defining a half of a bore to contain the pin at least one of the components including an integral projection to engage in the groove in the pin, at least one of the components including flanges or the equivalent to engage the sides of the arm and locate the adaptor laterally of the arm, and at least one of the components having resilient detent means adapted to engage a portion of the arm so as to locate the adaptor longitudinally of the arm.

The invention covers both such sets of parts, and also adaptors suitable for use as a part in such a set of parts.

Preferably the said two components of the adaptor are integrally linked by a flexible strap.

The said two components of the adaptor may have mating portions which resist relative displacement of the said two components parallel to the axis of the pin.

Preferably each of the two components includes an internal projection, the internal

projection on one such component and the internal projection on the other such component together constituting an annular rib which is complementary to the groove in the pin.

Each of the two components may have two flanges defining a channel to receive a respective straight part of the arm.

The accompanying drawings show one example of an adaptor according to the invention, and portions of a wiper arm and mounting pin with which it can be assembled. In these drawings:—

Figure 1 is a plan of an adaptor in the assembled condition;

Figure 2 is a side elevation of the same adaptor;

Figure 3 is a section on the line III—III in Figure 4;

Figure 4 is a section on the line IV—IV in Figure 3;

Figure 5 is an outline side elevation of the outer portion of a wiper arm; and

Figure 6 is a section on the line VI—VI in Figure 3.

(Figures 3, 4, 5 and 6 are on a larger scale than Figures 1 and 2).

The adaptor consists of two components 2 and 4, which are integrally linked by a flexible strap 6. The components and strap can be made in the attitude shown in Figures 1 and 2, by injection moulding of a plastics material in a single mould. A suitable plastics material is polycarbonate. The two components 2 and 4 are identical, except that the component 2 has a flat bounding surface 8, in which is a recess 10, whereas the component 4 has a flat bounding surface 12, on which is a projection 14. The projection 14 matches the recess 10, so that the two components can be assembled, with their faces 8, 12 in contact, being located relatively to one another by entry of the projection 14 into the recess 10. This is the condition shown in Figure 3.

During this assembly operation, the strap 6 is bent round in a semi-circle. The purpose of the strap 6 is firstly to ensure that a user always has readily available two components which will fit together as required; and secondly to facilitate manufacture (a single mould sufficing) and packing of the adaptor.

The pin 15 of the wiper blade is shown in Figure 4. The pin has a collar 16, and in Figure 4 the part of the pin above the collar is not shown. This part serves as a pivot between components of a harness of a wiper blade, in a well-known manner. The part of the pin below the collar 16 in Figure 4 serves as the actual mounting pin. It has a tapered nose 18, and two cylindrical portions 20, 22 of equal diameter, between which is a circumferential groove 24.

When the components 2 and 4 are assembled, as shown in Figure 3, they define a bore which matches the pin. In use, there-

fore, the components can be assembled around the pin, as shown in Figure 3, and the components then define a cylindrical bore, including an integral internal annular rib 26 which is complementary to the groove 24 in the pin. The rib 26 cooperates with one boundary 28 of the groove, to resist relative movement of the pin and the components along the axis of the pin, and a boss 30 on one side of the components cooperates with the flange 16 of the pin to resist motion in the opposite direction. Thus, the only relative motion permitted is relative rotation about the axis of the pin.

At the same time, the two components 2 and 4 constitute a body having an external shape which fits into the U-shaped space 32 defined by the parts of the wiper arm 33 shown in Figure 5. This fitting is shown in Figure 3. (The wiper arm is not shown in Figure 4.)

Each of the components has two flanges 34 defining a channel 36 to receive a respective straight part 38, 40 of the wiper arm (Figure 6).

In addition, the body constituted by the two components 2 and 4 has two resilient detents, each detent being made up of a part 42 on the component 2 and a part 44 on the component 4. Considering in particular the parts 42, shown in Figures 3 and 4, the detents extend past the sides of the curved part 46 of the wiper arm, and have shoulders 48 which engage the outer face 50 of the curved part 46.

The body is assembled with the wiper arm by movement from left to right, as seen in Figures 3 and 4, and the detents have bevelled surfaces 52 which enable the detents to ride past each side of the curved part 46, until the shoulders 48 snap into engagement with the surface 50.

In this condition, the presence of the wiper arm prevents separation of the two components 2 and 4 of the adaptor, and consequently the pin is trapped in assembled condition with the adaptor. At the same time, the shoulders 48 prevent separation of the adaptor from the wiper arm. In use, the shoulders 48 do not experience large loads, because centrifugal forces on the wiper blade unit tend to cause the adaptor to move to the right in Figures 3 and 4 relatively to the wiper arm, and this movement is resisted by engagement of a large surface 54 of the body with the inner face 56 of the curved part 46 of the wiper arm.

One method of releasing the adaptor from the wiper arm is to engage the bevel surfaces 52 with the corner of a rigid object, as indicated by the broken line 58 in Figure 4, and then apply to the wiper arm a force towards the right. This causes the wiper arm to exert a force towards the right against the shoulders 48, and in consequence the bevelled surfaces

52 ride to the right relatively to the corner 58, and become spread apart, until the detents separate to an extent sufficient to enable the curved part 46 of the wiper arm to pass the shoulders 48, and move to the right. Thereupon, the corner 58 can be removed, and the body comprising the two components 2 and 4 can be totally disengaged from the wiper arm by shifting to the left in Figure 3 relatively to the wiper arm. Finally, the two components 2 and 4 can be separated to release the pin.

However, when the wiper arm is secured to a wiper shaft of a vehicle, it may be possible to release the adaptor by exerting force by hand on it, or on the wiper blade unit, without the use of any tool.

Among the variations which are within the scope of the present invention are the following:—

- a) the flanges 34 on one of the components 2, 4 may be omitted.
- b) the components 2, 4 may be made in separate moulds, the strap 6 being absent.
- c) the two components may be identical, in which case each component has a recess at one side of a longitudinal central plane (like half of the recess 10), and a complementary projection at the other side of the plane (like half of the projection 14).
- d) the components may each rely on flanges 34 for location in directions parallel to the axis of the pin 15. Then the recess 10 and projection 14 may be absent.
- e) projections which are functionally equivalent to the flanges 34 may replace them on one or both the components 2, 4.
- f) the internal projection or rib 26 may be formed on only one of the components 2, 4.
- g) the wiper arm 33 may be wider, in which case the components 2 and 4 are wider, in order to provide wider channels 36, and the bosses 30 are reduced or absent.

#### WHAT WE CLAIM IS:—

1. A set of parts comprising a wiper blade, a wiper arm, and an adaptor; the wiper blade including a circumferentially grooved mounting pin, extending from a side of the blade; characterised in that the wiper arm is of a kind, known per se, having an outer portion of rectangular section and comprising, in succession, a straight main part, a part curved

into semi-circular shape, and a short straight terminal part, parallel to and spaced from a lower face of the main part; and in that the adaptor comprises two components which can be assembled to meet substantially in a plane containing the axis of the pin and so constitute a body having an external shape which fits into the U-shaped space defined by the parts of the arm, each component defining a half of a bore to contain the pin, at least one of the components including an integral internal projection to engage in the groove in the pin, at least one of the components including flanges or the equivalent to engage the sides of the arm and locate the adaptor laterally of the arm, and at least one of the components having resilient detent means adapted to engage a portion of the arm so as to locate the adaptor longitudinally of the arm.

2. A set of parts according to claim 1, in which the said two components of the adaptor are integrally linked by a flexible strap.

3. A set of parts according to claim 1 or claim 2, in which the said two components of the adaptor have mating portions which resist relative displacement of the said two components parallel to the axis of the pin.

4. A set of parts according to any of claims 1 to 3, in which each of the components includes an internal projection, the internal projection on one such component and the internal projection on the other such component together constituting an annular rib which is complementary to the groove in the pin.

5. A set of parts according to any of claims 1 to 4, in which each of the said two components of the adaptor has two flanges, defining a channel to receive a respective straight part of the arm.

6. A set of parts according to claim 1, substantially as described with reference to the accompanying drawings.

7. An adaptor suitable for use as a part in a set of parts as defined in any of claims 1 to 6.

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COMPLETE SPECIFICATION

2 SHEETS

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Sheet 1

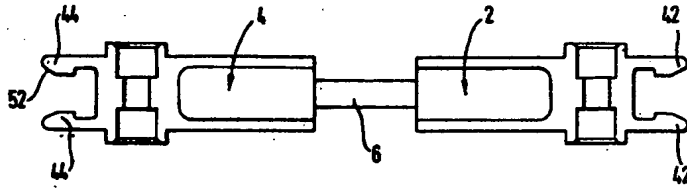


Fig. 1

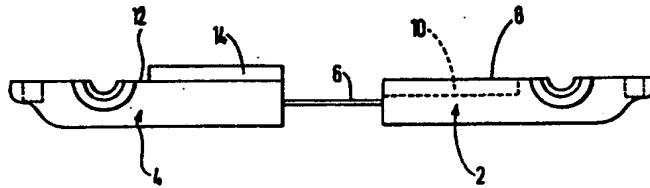


Fig. 2

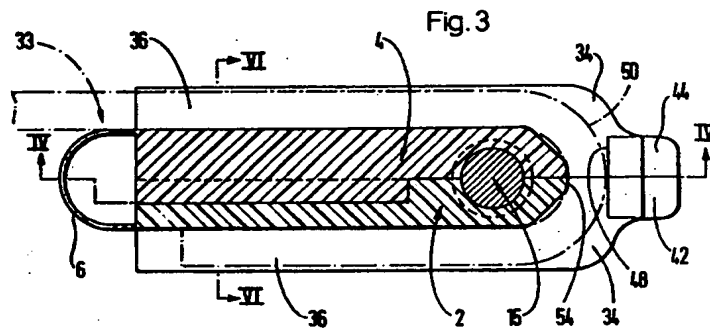


Fig. 3

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COMPLETE SPECIFICATION

2 SHEETS

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Sheet 2

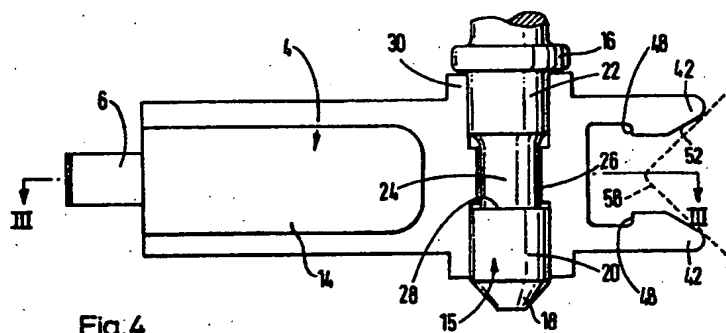


Fig. 4

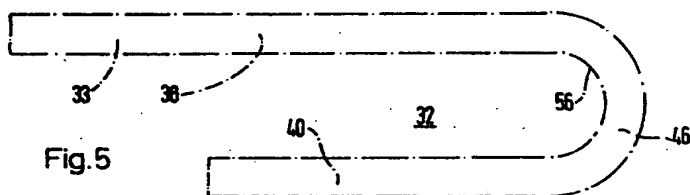


Fig. 5

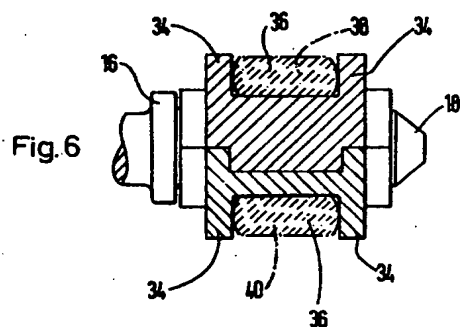


Fig. 6